

Computers & Electronics

MARCH 1983

\$1.25

formerly Popular Electronics

How Video Recordists Tap Cable TV Programs

A PRACTICAL GUIDE:

"Working" the Computer Networks

Learning 16-Bit Microcomputer Technology

The
British
Are
Coming!

First-hand
examination
of BBC and
Torch Micro-
computers



Tested in This Issue:

- Zenith "System 3" Color TV Receiver (outgoing and incoming wireless telephone control)
- Marantz 46 watts/channel Stereo FM/AM Receiver

KEVIN JOURNEAUX
68 EASTON AV
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Kevin Journeau

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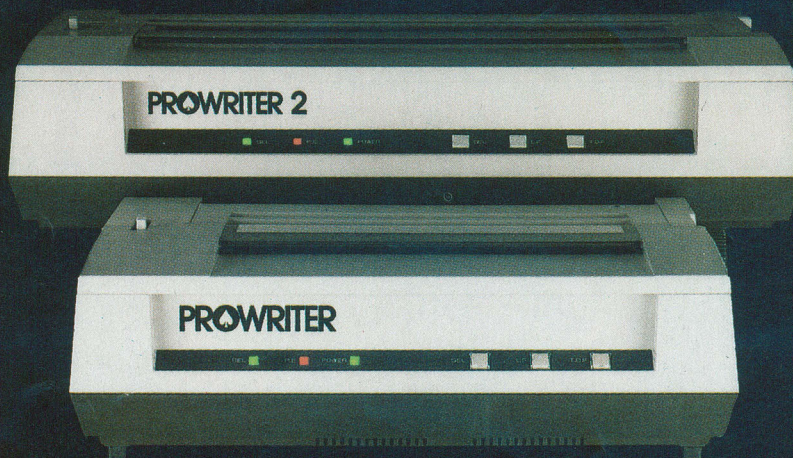
Finally, there's one full family of printers that covers every business or word processing application—all from C. Itoh, a company known for packing more product into less price; and all distributed exclusively by Leading Edge, a company known for searching out and providing that very thing. Which means that one call to one source can get you any printer, any time you need it, for any purpose. All backed by a full years' warranty from Leading Edge. (Try *that* on any other line of printers.)

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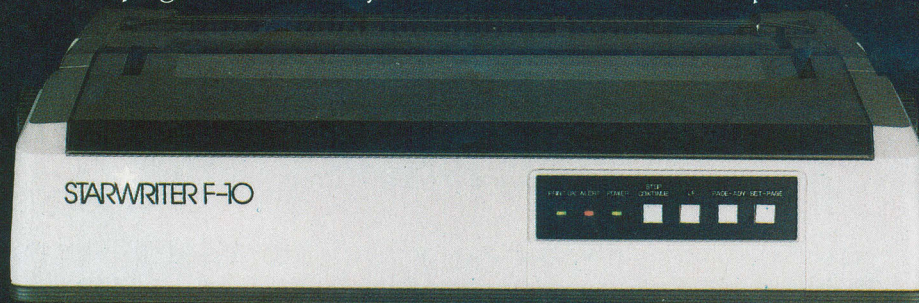
Prowriter: 120 cps. 80 columns dot matrix compressable to 136. 10" carriage. Parallel or serial interface.

Prowriter 2: Same as Prowriter, except 15" carriage allows full 136 columns in normal print mode. Parallel or serial interface.



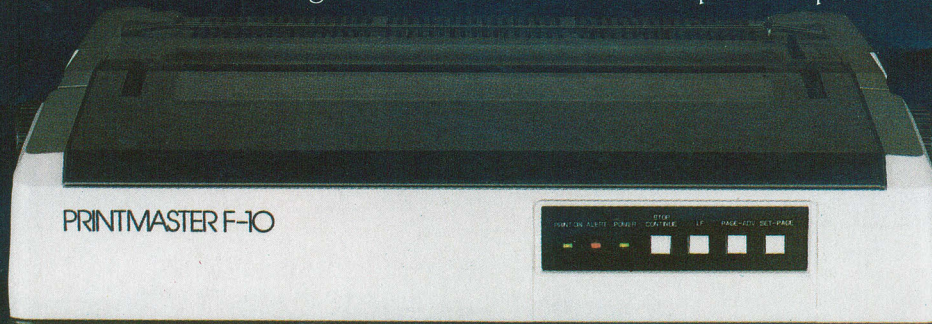
THE STAR.

The Starwriter F-10. In short (or more precisely, in a sleek 6" high, 30-pound unit), it gives you more of just about everything—except bulk and noise—than any other printer in its price range. It's a 40 cps letter-quality daisy-wheel with a bunch of built-in functions to simplify and speed up word processing. It plugs into almost any micro on the market, serial or parallel.



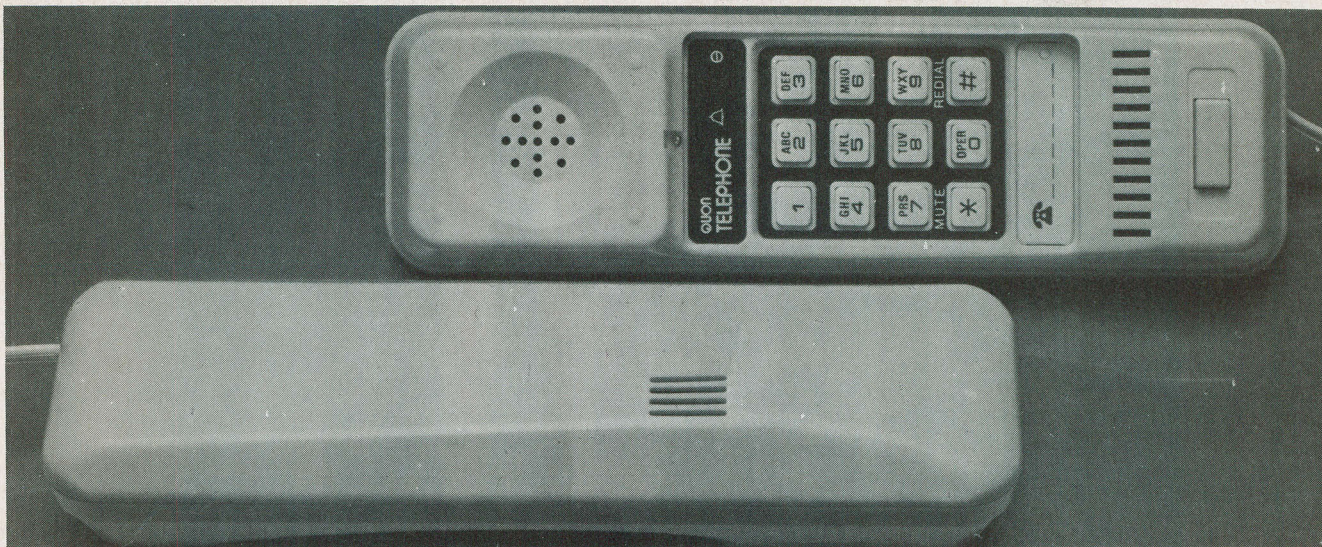
THE MASTER.

The Printmaster F-10. Does all the same good stuff as the Starwriter except, at 55 cps, the Master does it faster.



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Now for just \$7 you'll have the latest technology at a price that'll let you have a phone in every room in your home. But, don't forget there's a catch.

NOTHING TO INSTALL

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They may even put them in free for

quality speaker instead of the old diaphragm 'thing' that's been in phones for 20 years. Even the electronic ring is new.

But, the nicest part of all are the push buttons. Once you've started using buttons you'll hate dialing the old way.

With this phone you can push the buttons as fast as you want. Then the phone sends out pulses on your line that work with virtually any phone system.

So this phone works anywhere. You can unplug it and move it from room to room or house to house in seconds.

The phone automatically hangs up when you set it down or you can push its 'hang up' button. It comes complete with an 8 foot cord, coiled at the phone end, and a limited warranty.

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WHY, YOU MAY BE ASKING?

You're very valuable to us in the form of future business. Over 150,000 customers have responded to bonuses like this. We find most of you keep buying once you've tried our cassettes and our prices; and that's a gamble worth taking.

NOT A BAD CATCH

DAK manufactures a cassette with no problems and great sound. We've been hot on the heels of the frequency responses of Maxell and TDK. The tape we made last year had a great frequency response up to 14,000hz.

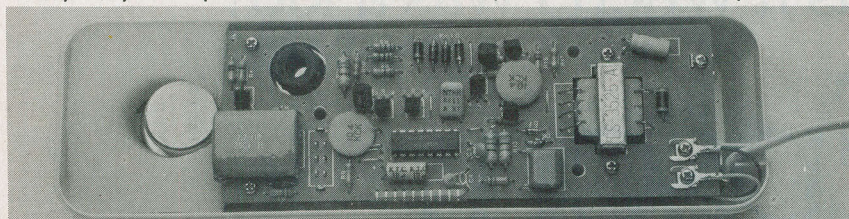
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An automated Phone for \$7 and DAK's new improved MLX. Time to stock up.



It's built more like a HiFi than a telephone. Modern electronics have finally come to phones.

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And you hear them through a high

THE CATCH

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Computers & Electronics

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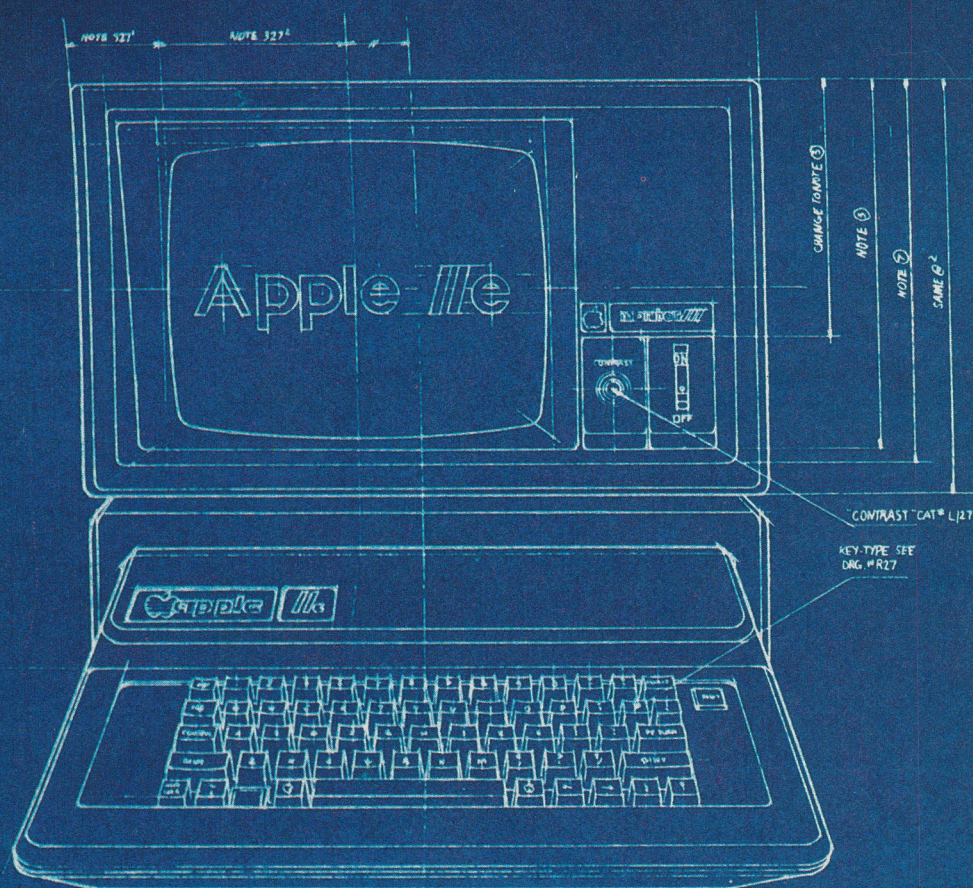
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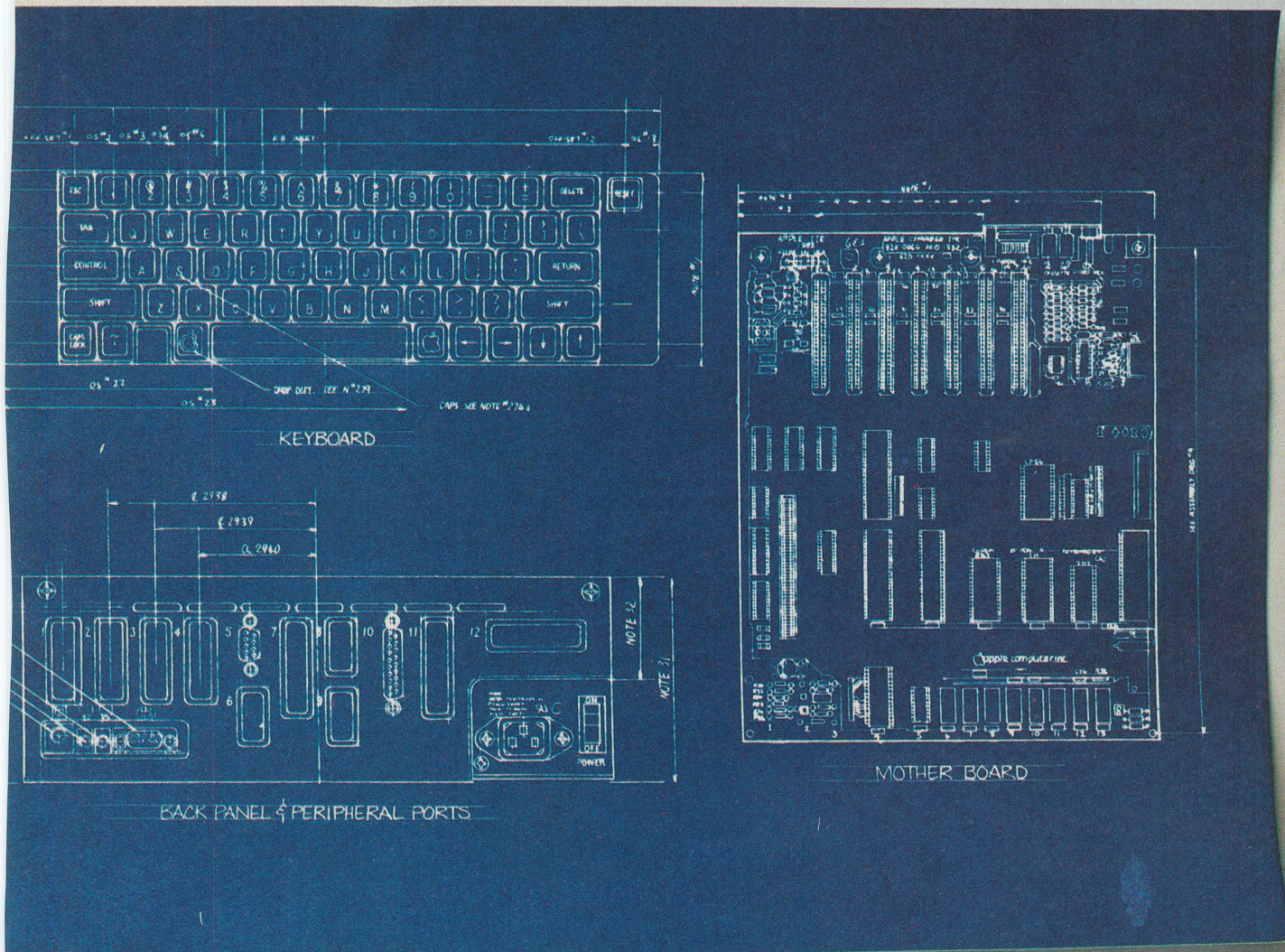
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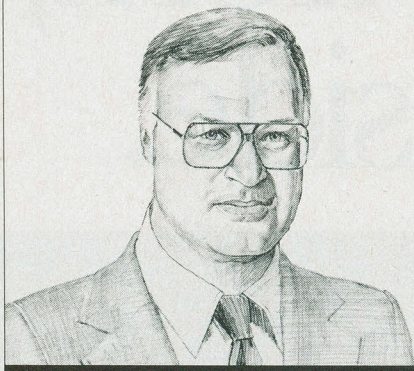


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CIRCLE NO. 35 ON FREE INFORMATION CARD

EDITORIAL



The Calculator Connection

About 14 years ago a new company, Intel (a contraction of INTEgrated ELEctronics), got a contract from a Japanese firm to produce integrated circuits for a new calculator. It called for almost a dozen ICs. The project head, Ted Hoff, combined this need with Yankee savvy into a monolithic chip called the Intel 4004, which was the first microprocessor.

The world hasn't been the same since. A few years later Intel introduced the first 8-bit microprocessor, aptly named the 8008. The pMOS CPU was super-

sed rather quickly owing to its limited instruction set and an inability to address more than 16K bytes by the nMOS 8080. This 8-bit device was able to access 65K of memory and had over 50% more instructions.

Again, a calculator maker came into the picture: MITS. The company's calculator business was in a nose dive, together with a host of others, and the owner, Ed Roberts, sought to enter the computer field using Intel's new device. The new computer, named Altair, was introduced to the world in our January 1975 issue. The calculator connection was made once again. A byproduct of the new computer was a bus with 100 connections, called the standard-100 or S-100 for short, which served as the impetus for a host of manufacturers to latch onto it with various peripherals and to establish a sort of mini (micro?) universal system that was recently standardized as the IEEE-696 bus.

Other companies developed and marketed their own microprocessors, including Motorola with its 6800 CPU, MOS Technology with its 6502, and Zilog with its Z80 (an improved outgrowth of the 8080 that spurred Intel to develop its 8085 CPU), among others.

The horsepower race continues today with the introduction of a number of 16-bit microprocessors. Actually, a 16-bit microprocessor from National Semiconductor was on the market before an 8-bit one was, but 16-biters did not come into prominence until a later time.

Even the early Texas Instruments 16-bit TMS-9900 didn't gain popularity, perhaps owing to its uniqueness. It really took Intel's 8088 16-bit CPU to dramatize the effectiveness of 16-bit devices for small computers. This "chip" is actually a modified 8086 that uses an 8-bit data bus instead of 16-bits, and programs written for it are upward compatible with the earlier 8080 CPU. Moreover, it is incorporated into the popular IBM-PC personal computer.

Furthermore, support chips must draw from the 8088 in order to work. Given all this, COMPUTERS & ELECTRONICS has chosen the 8088 as the heart of a microcomputer course initiated in this issue. As the course unfolds, you'll doubtlessly observe that it isn't pure electronics; nor is it software. It's logic-oriented, with the "electronics" in black-box devices that essentially consist of solid-state on-off switches that are often packaged as thousands to a device.

The final calculator connection here appears to have been made recently when IBM, which had a hand in developing an early general-purpose calculator, the Harvard Mark I, bought a piece of the (silicon) rock—Intel.

Art Salsberg

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LETTERS

PARALLEL PAIRS

The "Calculating Parallel Resistance Pairs" article in the December 1982 issue gives a simple short-cut for finding two or more resistance values to substitute for one that is not available. However, it should have been pointed out that the choice of the number used as the multiplier for finding the values of $R1$ and $R2$ is a random choice. The author used 4—it could have been 8 or 9. However, once the number is chosen for the multiplier, then the number used for the divisor must be one less, or 3 in the example—*Mack D. Baxter, Granite Shoals, TX.*

LINE SPIKES SET OFF ALARM

I built the "New, Effective Anti-Burglary System" (June 1982) and found that sometimes disturbances (spikes) on the power line will set off the alarm. The problem can be corrected to an extent by placing capacitors across the power transformer leads. However, in some cases, a capacitor must be applied across the source of the disturbance—refrigerator, fluorescent light, etc.—*David Crotty, Highland Park, MI.*

PRINTING COLOR GRAPHICS

With regard to the article "Printing Computer Graphics" (November, 1982), please note the following concerning the TRS-80 Color Computer. The early versions of the Color Computer had 7-bit printer drivers, limiting the values transmitted to 127. A cassette 8-bit driver program is available free to bring the machine to 8 bits out. Machines manufactured after April 1981, (Ver. 1.1) have had 8-bit drives built-in, and can transmit the 8-bit values needed for graphic printing. The screen print program (26-3021), which dumps a high-resolution screen to TRS-80 graphic printers also has an 8-bit output driver. The TRS-LP VIII also includes graphic capabilities.—*Roy J. Irvine, Radio Shack, Fort Worth, TX.*

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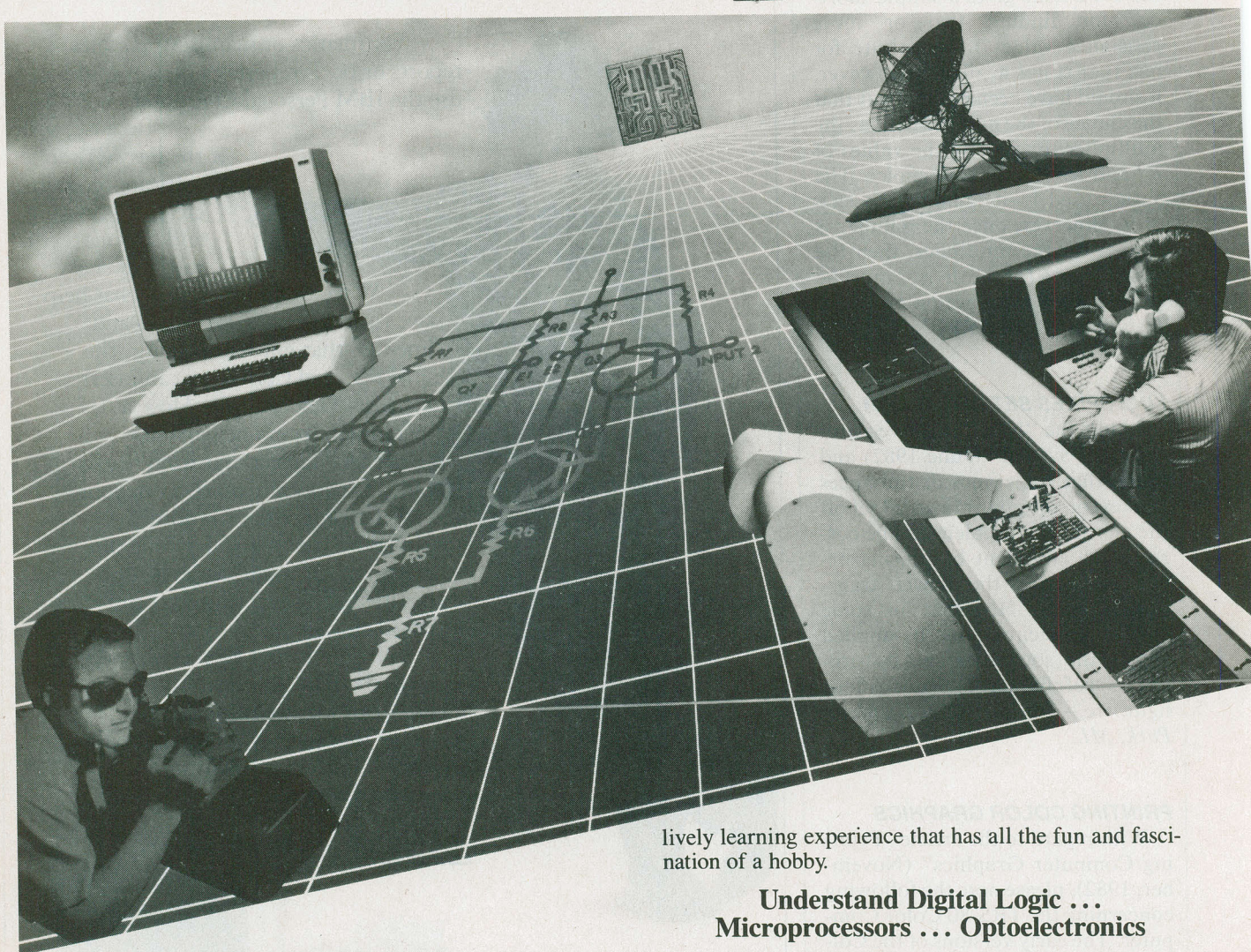
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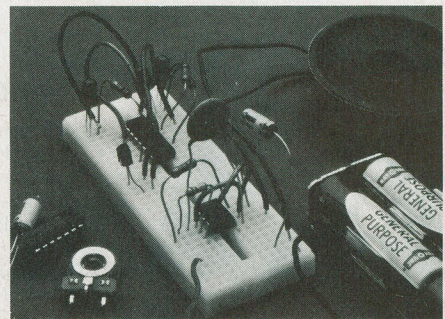
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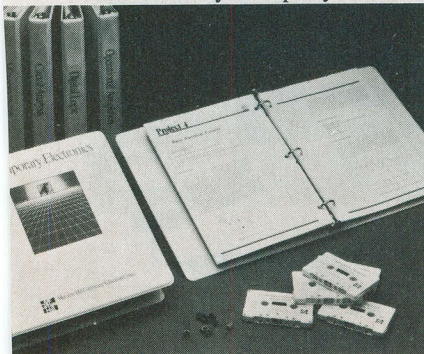
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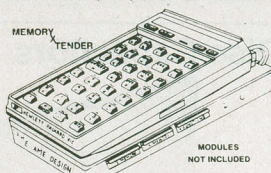


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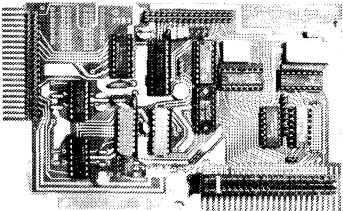
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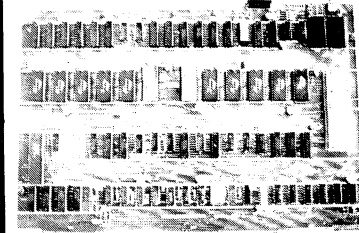
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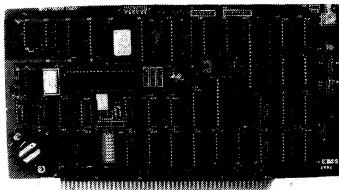
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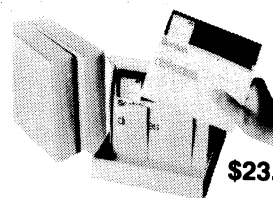
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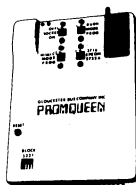
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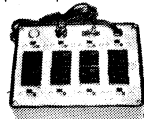
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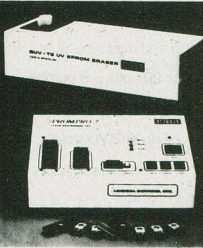
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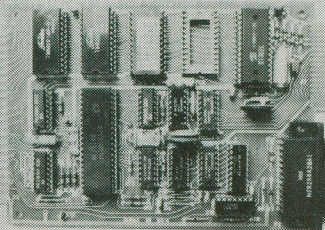
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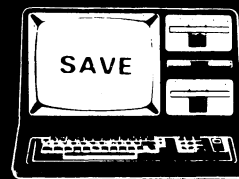
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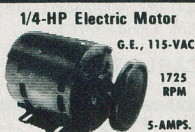
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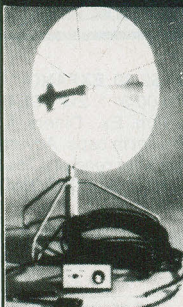
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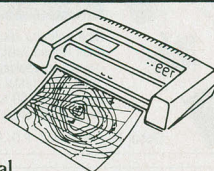
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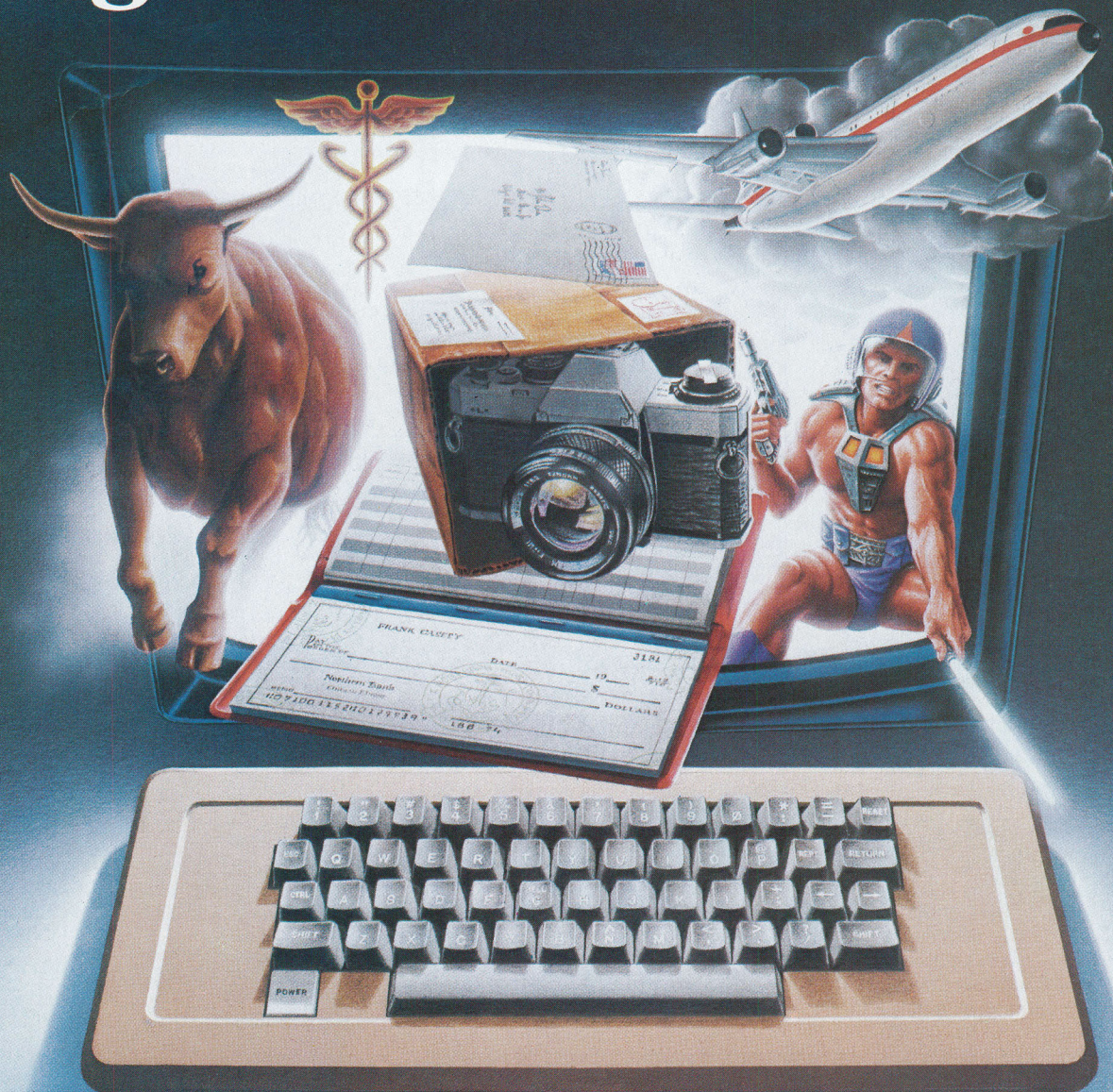
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NOW THAT YOU KNOW HOW EASY A COMMODORE HOME COMPUTER IS TO OWN, FIND OUT HOW EASY IT IS TO EXPAND.

One thing about home computers that you're bound to discover at home is that, once you learn what they can do, you'll want them to do more and more. To do this, you may need accessories called peripherals. These let you

early to start planning to add peripherals. If that's what you think, you're once again playing right into the hands of our competitors.

Because once they've gotten you to buy their home computer, for what seems to be a reasonable price, they have you hooked on their system.

The costs of which, if you'll examine the chart below, can really start getting unreasonable. For example, while these computers may seem to be close to the same price to start, an expanded system

competition.

They know that an impressively low price can divert your attention from some depressingly cheap features. So that you won't know what you may be missing with their home computer until after it's been in your home for a while.

At which point, naturally, it'll cost you to change your mind.

IT'S EASY TO TELL THE DIFFERENCE.

Fortunately, you don't have to be a computer engineer to tell what makes the

Commodore VIC 20™ superior to the competition.

All you have to do is take advantage of three of your five senses.

Use your sense of vision and read this comparison chart. You can see in black and white where two of our major

EXPANSION COSTS	VIC 20™ or COMMODORE 64™	TI99/4A®	ATARI 400®
BASIC	Included	Included	\$59.95
Peripheral Expansion System	Not Necessary	\$249.95	Not Necessary
Disk Drive	\$399.00	399.95	599.95
Disk Controller Card	Included	249.95	Included
Modem	109.95	224.95	199.95
Modem Interface	Included	174.95	219.95
TOTAL	\$508.95	\$1299.75	\$1079.80

Manufacturer's suggested list prices: Prices per TI June-December 1982 U.S. Consumer Products Suggested Price List. Atari prices effective July 1, 1982 Suggested Retail Price List.

get more out of a home computer by letting you put more into it.

They include items like cassette recorders and disk drives to input data, modems for telecomputing and printers. And all VIC 20 peripherals are fully compatible with the powerful Commodore 64™ personal computer.

PLAN AHEAD.

When you start looking at your first home computer, you may think it's too

can cost you twice as much with TI or Atari as with the Commodore VIC 20 or Commodore 64.

THINK OF IT AS BUYING A TOASTER.

It's easy to fill up a computer ad with RAM's and ROM's, numbers and technical jargon. But when it comes right



down to it, buying a home computer is just like buying anything else. It's important to know just what you're getting for your hard-earned money.

And we hope we've accomplished that here by telling you about the cost of expanding your Commodore VIC 20 or Commodore 64 computer.

COMPUTER FEATURES	VIC 20	TI 99/4A	ATARI 400
Typewriter Keys	Yes	Yes	No
Typewriter Feel	Yes	No	No
Color Control Keys	Yes	No	No
Graphics on Keys	Yes	No	No
Reverse Letters	Yes	No	Yes
Programmable Function Keys	Yes	No	No
Works with TV or Monitor	Yes	Yes	No
True Lower Case Letters	Yes	No	Yes
DISK FEATURES			
Capacity	170K	90K	88K

commodore
COMPUTER